

## Math 3C Fall 2014

### Pre-lecture 3-1 Due: Beginning of lecture-Monday, October 20.

This is to be done on your own paper. Please write your name (last name first) on the top right corner along with your discussion section number (B02, B03 etc) and “pre-lecture [number]” (in this case “pre-lecture 3-1”).

This will be graded on effort and thoughtfulness, not on correctness. With that said, do not feel obligated to write more than necessary. This is intended for you to work on your own.

1. Draw a coordinate plane going from  $-8$  to  $8$  on both axes. On this coordinate plane, with the help of a calculator or by plotting some points:

- (a) Draw the graph of the function  $f(x) = x^2$  with domain  $[0, \infty)$ .
- (b) Find the inverse of  $f(x)$  (In other words find  $f^{-1}(x)$ ). What is  $f^{-1}(x)$ ?  
Draw the graph of  $f^{-1}(x)$ .
- (c) Also graph the equation  $y = x$ .

What do you notice?

2. Draw a new coordinate plane going from  $-8$  to  $8$  on both axes. On this coordinate plane, with the help of a calculator or by plotting some points:

- (a) Draw the graph of the function  $g(x) = x^2$  with domain  $(-\infty, 0]$
- (b) Find the inverse of  $g(x)$  (In other words find  $g^{-1}(x)$ ). What is  $g^{-1}(x)$ ? (Hint: It is different than question 1, part (b))  
Draw the graph of  $g^{-1}(x)$ .
- (c) Also graph the equation  $y = x$ .  
What do you notice?  
Can you think of a reason for why this pattern exists?

3. Draw a new coordinate plane going from  $-8$  to  $8$  on both axes. We will now “try” to plot the graph of the inverse of  $h(x) = x^2$  with domain  $(-\infty, \infty)$ . On this coordinate plane:

- (a) Draw the graph of the function  $h(x) = x^2$
- (b) Draw the graph of the function  $f^{-1}(x)$  from question 1, part (b).
- (c) Draw the graph of the function  $g^{-1}(x)$  from question 2, part (b).  
We would like to make these last two graphs into one function “ $h^{-1}(x)$ ”. However, what is the problem?
- (d) Can you think of some “test” that would make sure that  $h(x)$  really has an inverse? (one similar to the vertical line test for functions)